

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

AMENDMENT "C" UNDER 37 C.F.R. §1.116

APPLICANTS:	Niederdrank et al.	GROUP ART UNIT: 2615
SERIAL NO.:	10/668,855	EXAMINER: Lun S. Lao
FILED:	September 23, 2003	CONFIRMATION NO.: 3145
TITLE:	FEEDBACK COMPENSATION FOR HEARING DEVICES WITH SYSTEM DISTANCE ESTIMATION	

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Commissioner for Patents
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S I R:

In response to the Office Action dated October 14, 2008, Applicants herewith
amend the application as follows.

IN THE SPECIFICATION

Paragraph [0016] at page 5 has been amended as follows:

[0016] It is therefore inventively provided to control the operation of the feedback compensator 5 by the embodiment shown according to Figure 2, in the simplest case to connect and disconnect. For control, an estimation unit 13 may be used that estimates the system distance, such that the feedback compensator 5 is first activated given very reduced or negative system distance. The estimation unit comprises a high-pass filter 6 and a low-pass filter 7. These are connected in parallel to the typical signal path between microphone 3 and hearing device signal processing 4, and they separate the output signal of the microphone 3, i.e., the input signal of the hearing device, into a high-frequency portion and a low-frequency portion.

Paragraph [0017] at page 5 has been amended as follows:

[0017] A feature extraction unit 8 or, respectively, 9 may be respectively connected subsequent to the high-pass filter 6 and the low-pass filter 7 in the estimation unit 13. The features acquired from the feature extraction unit 9 may be associated with model data of a model 10, and the resulting data may then be compared in an evaluation unit 11 with the data of the feature extraction unit 8. The comparison result is a measurement of the system distance, with which the feedback compensator 5 is controlled.

Paragraph [0018] at pages 5 and 6 has been amended as follows:

[0018] The function of the estimation unit 13 can be specified as follows: the input signal of the hearing device is separated by the high-pass filter 6 and the low-pass filter 7 into a high-frequency portion and a low-frequency portion. The

threshold between high-frequency and low-frequency may be selected such that the typical ensuing coupling is arranged in the high-frequency range. For example, the threshold is at 1.5 kHz.

IN THE DRAWINGS:

Each of Figures, 2, 3, 4, 5 and 6 has been amended as shown on the replacement sheets attached hereto.

REMARKS

Applicants note with appreciation the telephone interview courteously afforded the undersigned representative of the Applicants on January 13, 2009. The following topics were discussed in the interview.

In the October 14, 2008 Office Action, the drawings were objected to under 37 C.F.R. §1.83(a) because the Examiner stated the drawings must show the estimation that is connected between the input device and the feedback reduction device. As explained in the specification as originally filed, the estimation unit includes the two filters 6 and 7 and the two feature extractors 8 and 9. Such an estimation unit has therefore been indicated in dashed lines in each of Figures 2, 3, 4, 5 and 6, and the written portion of the specification has been editorially amended to identify the estimation unit with reference numeral 13. Since the estimation unit is clearly identified in the specification as originally filed, no new matter is added thereby.

Claims 15 and 22 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement, because the Examiner stated that the specification does not clearly disclose how the system distance is derived from the loop gain and the predetermined stability limit of the feedback loop. The same comment was made with regard to claim 22. In fact, the term "system distance" is a well-known and commonly used term in the field of hearing aid devices, and is also used in the Kates et al. reference relied upon by the Examiner in the same manner as it is used in the present specification. In the present specification, the system distance is explicitly defined in paragraph [0009] in exactly the same manner as it is defined in the last claim element of each of claims 15 and 22. That last claim

element in each of those claims refers to the “loop gain,” which is explicitly defined in each of those claims earlier as being a gain that changes dependent on the amplification gain provided by the signal processor, which is also consistent with the definition provided in paragraph [0009].

Although not specifically called the “system distance,” this characteristic is the same characteristic as is calculated in the paragraph beginning at column 14, line 55 and proceeding through column 15, line 23 in the Kates et al. reference, thereby providing further evidence that this concept is well-known and understood by those of ordinary skill in the field of hearing aid design.

Applicants therefore respectfully submit that the subject matter of claims 15 and 22 is described in the present specification in full compliance with the enablement requirement of 35 U.S.C. §112, first paragraph.

Claims 15, 19, 20 and 22 were rejected under 35 U.S.C. §102(b) as being anticipated by Kates et al. This rejection was also discussed in the telephone interview. In the telephone interview, the Examiner stated, in his opinion, claims 1 and 22 only “superficially” claim the Applicants’ invention, and therefore the Examiner believes those claims are readable on the disclosure of Kates et al.

Applicants respectfully disagree and believe each of independent claims 15 and 22 includes detailed method steps or detailed structure that distinguishes each of those claims over the disclosure of the Kates et al. reference.

As discussed in the telephone interview, in the hearing device and method disclosed and claimed in the present application, a feedback reduction device is connected between the signal input device and the signal output device, and this feedback reduction device operates to adjustably reduce, compensate or damp the

feedback caused by the feedback loop, by making use of at least one adjustable parameter that influences the processed signal.

Also in accordance with the invention, the aforementioned estimation unit, that is connected between the signal input device and the feedback reduction device, estimates, from the electrical input signal, an estimated value of the aforementioned system distance. Each of claims 15 and 22 explicitly states that the estimation unit supplies the estimated value to the aforementioned feedback reduction device, and the feedback reduction device generates the aforementioned parameter dependent on this estimated value.

The feedback reduction device in claims 15 and 22 can thus be considered as representing the feedback transfer function W that is used in the above-identified calculation in column 15 of the Kates et al. reference. It is true, as noted by the Examiner, that in the Kates et al. reference, this transfer function W is set to zero in order to determine the maximum gain H_{\max} at all frequencies. The Kates et al. reference then states that the system will be stable if $H_{\max}(\text{MARB})I$ is less than 1, and this allows the maximum gain H_{\max} to be expressed as $1/\text{MARB}I$. The Kates et al. reference also states that when the hearing aid is turned on, W_0 will be equal to MARB. Immediately following this statement, the Kates et al. reference states that no feedback cancellation can be estimated directly from the initial feedback model.

Therefore, the aforementioned calculations are undertaken in the Kates et al. reference in order to determine H_{\max} , but there is no teaching whatsoever in the Kates et al. reference to vary the feedback transfer function W dependent on the system distance, as explicitly claimed in each of claims 15 and 22. In the Kates et al. reference, the transfer function W can be set to different values in order to

facilitate the aforementioned calculations, but this is not the same as varying the value W dependent on the estimated system distance, as disclosed and claimed in the present application.

Applicants therefore respectfully submit that claims 15 and 22 do not "superficially" claim the subject that Applicants regard as their invention, but in fact claim that subject matter in a manner that is sufficiently detailed so as to be distinguishable over the disclosure of the Kates et al. reference.

The Kates et al. reference, therefore, does not disclose all of the components of the hearing device of claim 15, nor all of the method steps of claim 22, as arranged and operating in those claims, and thus the Kates et al. reference does not anticipate either of those independent claims.

Claims 19 and 20 add further structure to the novel combination of claim 15, and therefore neither of claims 19 and 20 is anticipated by Kates et al., for the same reasons discussed above in connection with claim 15.

Claims 16, 18, 23 and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kates et al. The above discussion is also applicable to this obviousness rejection based on Kates et al. As noted above, there is no disclosure whatsoever anywhere in the extensive specification of the Kates et al. reference to vary the value W dependent on the estimated system distance, as explicitly set forth in each of claims 15 and 22. Therefore, there is no teaching, suggestion, guidance or motivation contained anywhere in the Kates et al. reference to modify that reference in order to undertake such an adjustment of the value W dependent on the estimated system distance. Since it would not have been obvious to modify either of claims 15 or 22 based on the teachings of Kates et al., none of claims 16, 18, 23 or

25 would have been obvious to a person of ordinary skill in the field of hearing aid design based on the disclosure of Kates et al.

Claims 17 and 24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kates et al., in view of Kates '986. Claims 21 and 26 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kates et al. in view of Nielsen et al.

For the same reasons discussed above in connection with the Kates et al. reference, even if that reference were further modified in accordance with the teachings of either of the aforementioned secondary references, the subject matter of none of the aforementioned dependent claims would result.

All claims of the application are therefore submitted to be in condition for allowance.

The present Amendment does not raise any new issues requiring further searching or consideration, and is therefore properly enterable at this stage of prosecution, after the Final Rejection, under the provisions of 37 C.F.R. §1.116.

The Commissioner is hereby authorized to charge any additional fees which may be required, or to credit any overpayment to account No. 501519.

Submitted by,

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FIG 2

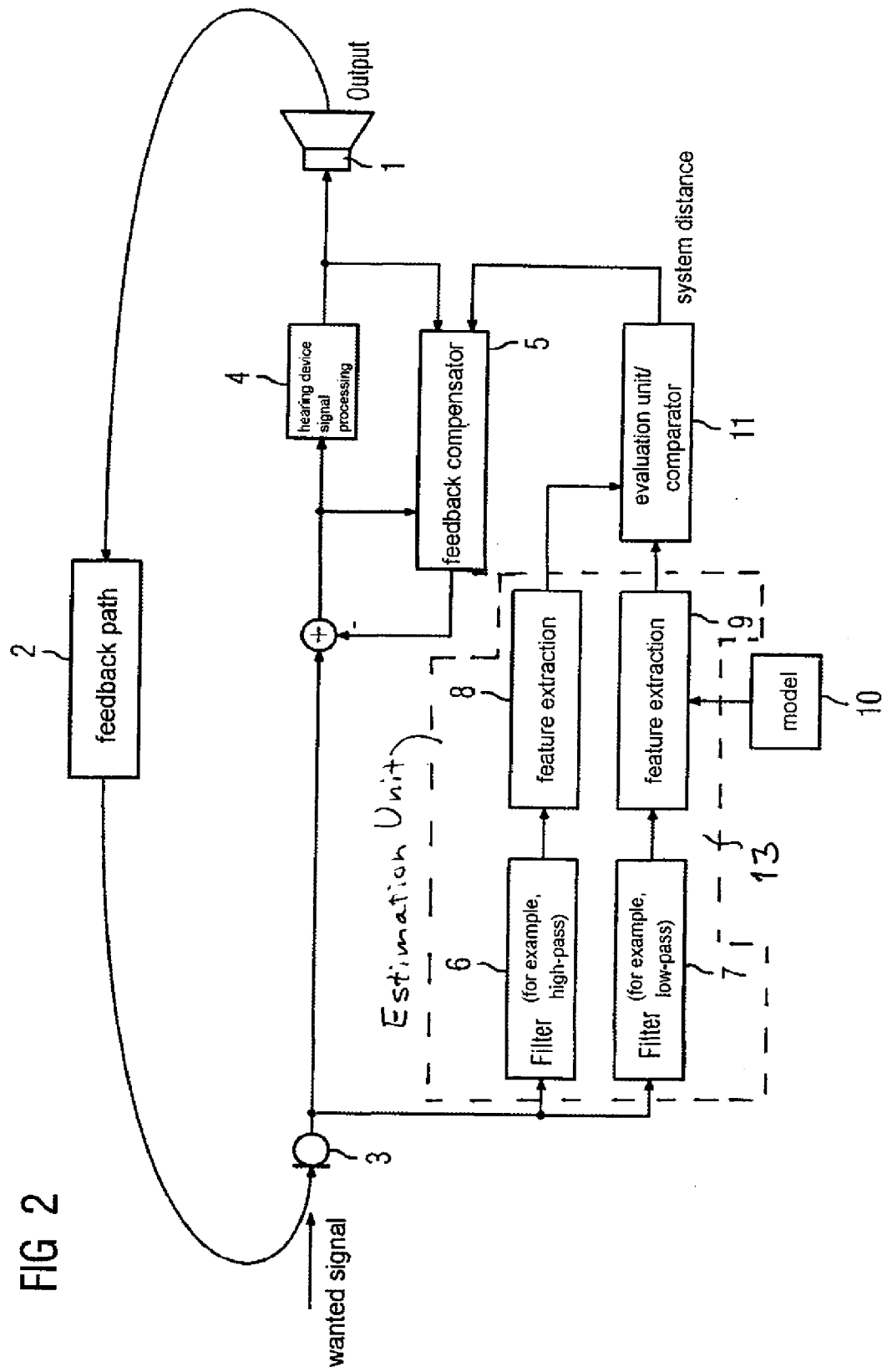


FIG 3

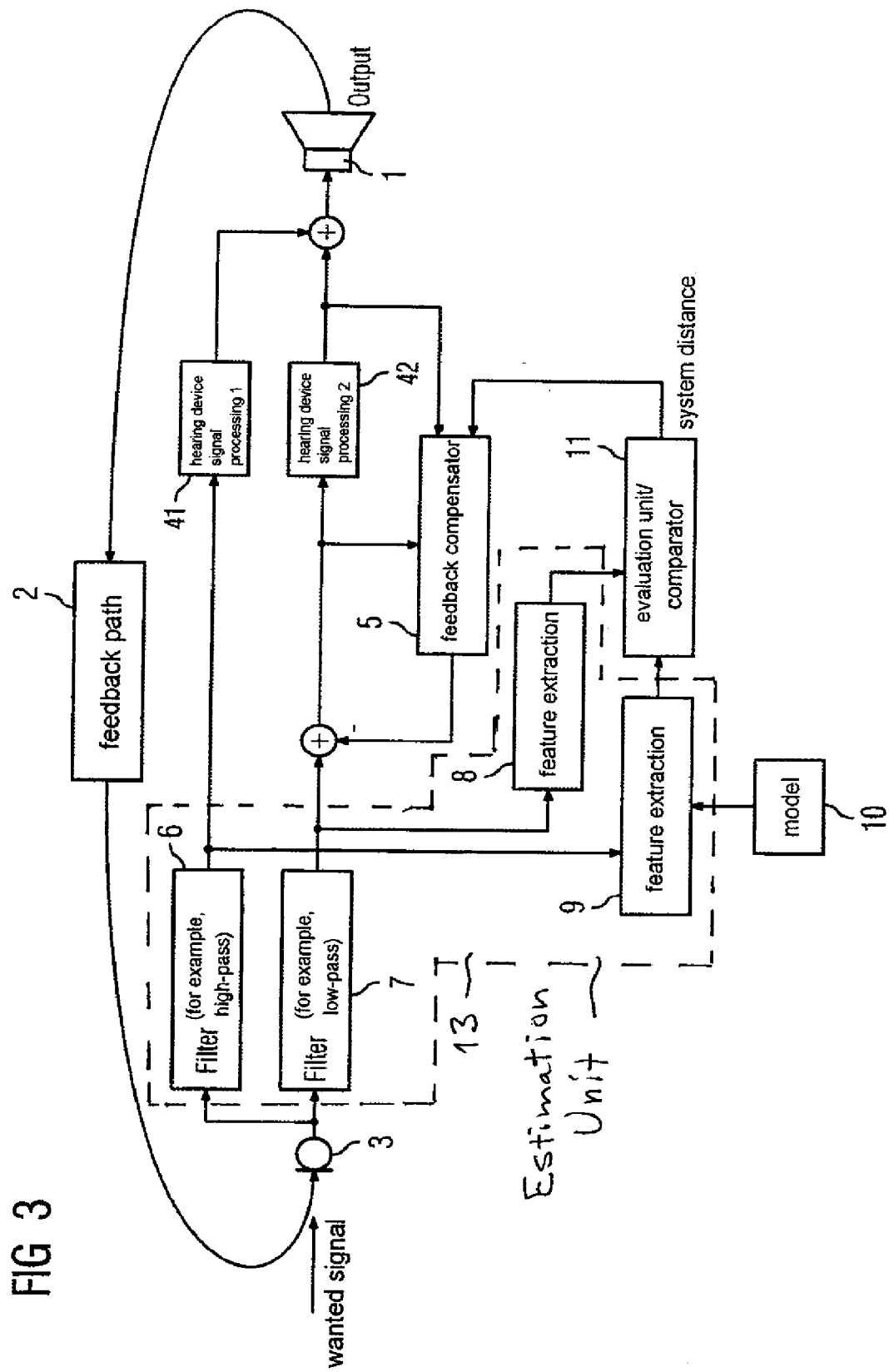


FIG 4

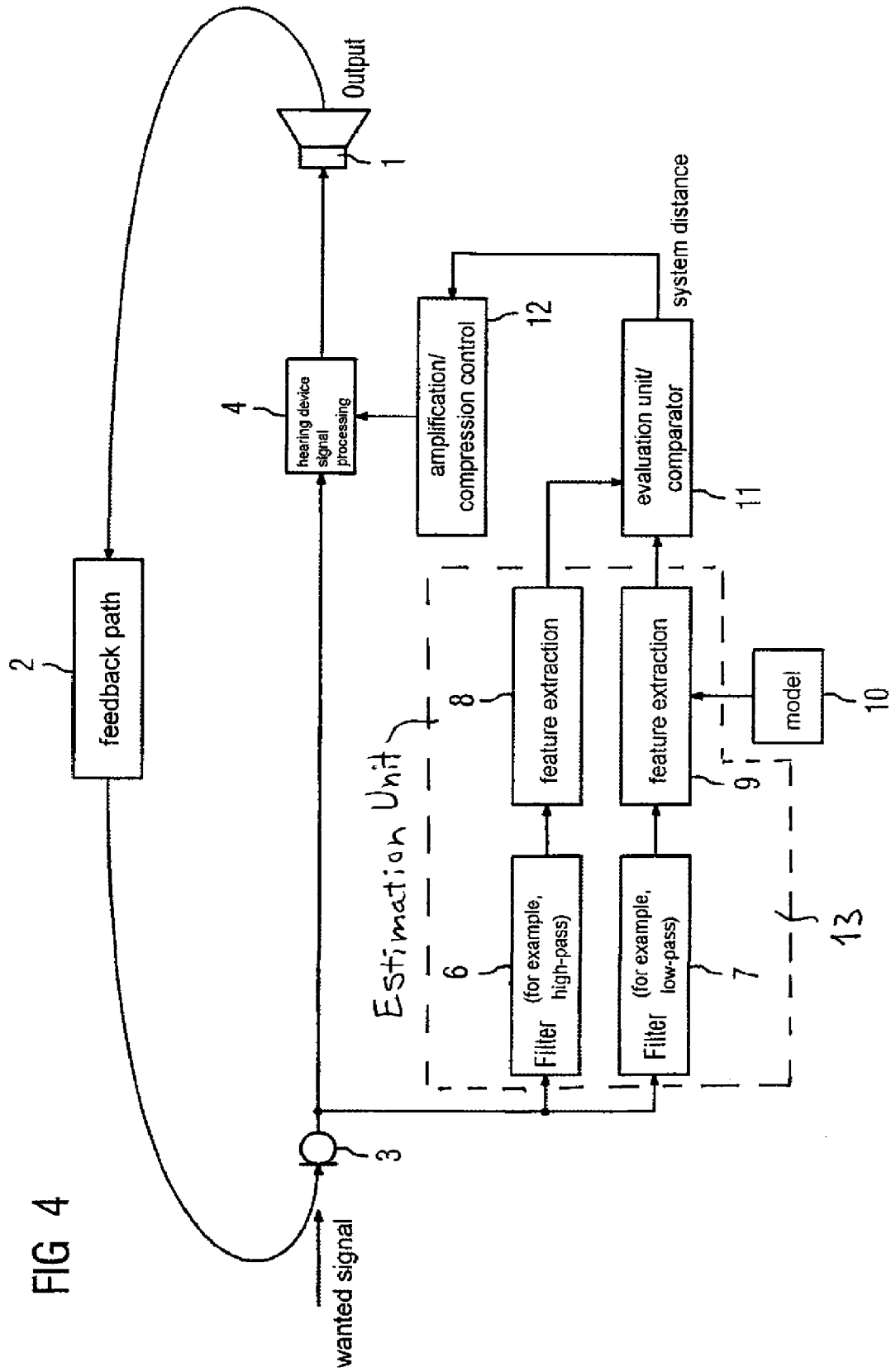


FIG 5

